


# Notes - Transformations of Functions

$$a f(b(x-c)) + d$$

$a$ : In front outside multiplied  
 $b$ : inside multiplied  
 $x-c$ : inside added  
 $d$ : outside added

$a$ : If  $a < 0$ , reflect over x-axis 


If  $|a| > 1$ , vertical stretch   
 ignore any negatives!

If  $|a| < 1$ , vertical shrink 

$b$ : If  $b < 0$ , reflect over y-axis 

If  $|b| > 1$ , horizontal shrink compression 

If  $|b| < 1$ , horizontal stretch 

$c$ : If  $c > 0$ , shifts right 

If  $c < 0$ , shifts left 

$d$ : If  $d > 0$ , shifts up 

If  $d < 0$ , shifts down 